

CLAIMS

What is claimed is:

1. A diagnostic system for a field device in a process control apparatus, comprising:
 - at least one sensor associated with the process control apparatus;
 - a computer located on the field device and adapted to receive data from the sensor and to detect an occurrence of a predetermined process event; and
 - a memory device operatively connected to the computer and adapted to store sensor data received by the computer at a time corresponding to the occurrence of the predetermined process event.
2. The diagnostic system of claim 1, wherein the memory device is further adapted to store sensor data received by the computer at times prior to the occurrence of the predetermined process event.
3. The diagnostic system of claim 1, wherein the memory device is further adapted to store sensor data received by the computer at times subsequent to the occurrence of the predetermined process event.
4. The diagnostic system of claim 1, wherein the memory device is further adapted to store sensor data received by the computer at times prior to the occurrence of the predetermined process event and subsequent to the occurrence of the predetermined process event.
5. The diagnostic system of claim 1, wherein the computer is a microcontroller located on the field device.

6. The diagnostic system of claim 1, wherein the memory device is located on the field device.
7. The diagnostic system of claim 6, wherein the memory device is a non-volatile RAM.
8. The diagnostic system of claim 1, wherein the field device is a valve positioner.
9. The diagnostic system of claim 1, wherein the predetermined process event is an excessive travel deviation of a valve element.
10. The diagnostic system of claim 1, wherein the predetermined process event is a sensor signal, representing a sensed valve parameter, crossing a cutoff point.
11. A method of monitoring the performance of a process control system including at least one field device, comprising:
 - providing at least one sensor associated with the field device;
 - providing a memory device on the field device;
 - collecting data from the sensor;
 - detecting the occurrence of a predetermined process event; and
 - storing data on the memory device from the sensor collected at a time corresponding to the occurrence of the predetermined process event.
12. The method of claim 11 further including storing data from the sensor collected at times prior to the occurrence of the predetermined process event.

13. The method of claim 11, further including storing data from the sensor collected at times subsequent to the occurrence of the predetermined process event
14. The method of claim 11, further including storing data from the sensor collected at times prior to the occurrence of the predetermined process event and subsequent to the occurrence of the predetermined process event.
15. The method of claim 11, wherein the predetermined process event is an excessive travel deviation of a valve element.
16. The method of claim 11, wherein the predetermined process event is a sensor signal, representing a sensed valve parameter, crossing a cutoff point.
17. A field device for a process control apparatus, comprising:
 - at least one sensor;
 - a computer located on the field device and adapted to receive data from the sensor and to detect an occurrence of a predetermined process event; and
 - a memory device operatively connected to the computer and adapted to store sensor data received by the computer at a time corresponding to the occurrence of the predetermined process event.
18. The field device of claim 17, wherein the predetermined process event is the occurrence of a sensed parameter being out of a predetermined range.
19. The field device of claim 17, wherein the predetermined process event is the failure of a sensor.
20. The field device of claim 17, wherein the predetermined process event is a component failure.

21. The field device of claim 17, wherein the predetermined process event is a process variable change.

22. The field device of claim 17, wherein the predetermined process event is a command from a process control workstation.